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REMARKS

This letter is filed in response to the office action mailed 30 December 2005.

Substitute sheets

Please replace the claim pages with the new pages, submitted herewith, containing claims 1-15.

Amendments

Claim 1 has been amended by incorporating the subject matter of former claim 14.

Former claim 14 has been withdrawn.

Remarks

Claim rejections 35 USC § 102

US patent no. 6,021,816 (Jeltsch et al.)

The Examiner has rejected claims 1, 2, 6-10 and 12-15 under 35 USC §102(e) as being anticipated by Jeltsch et al. The applicant respectfully disagrees.

Claim 1, as amended, is directed to a flexible tube having a bellows comprising convolutes, wherein the convolutes have opposed bending sections and opposed restrained elongation sections, and wherein the height of the bending sections is greater than the height of the restrained elongation sections, and wherein at least two convolutes are juxtaposed and have their respective bending sections and restrained elongation sections aligned.

The Examiner asserts that Figure 1D of Jeltsch et al. discloses such an arrangement. The Applicant respectfully submits that Jeltsch et al. do not disclose the arrangement claimed in claim 1. The applicant submits that Figure 1D of Jeltsch et al. has been badly drawn. Although it may give the impression of showing a tube having convolutes which extend the full circumference of the tube, and which have a

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lesser height along the axis "L" than elsewhere in their circumference, it does not. The teaching of Jeltsch *et al.*, in its entirety, concerns corrugated pipes in which the lines designated "L" in Figure 1D are "free of corrugations" [Jeltsch *et al.*, column 4, lines 14-15]. In other words, the lines "L" are flat with the jacket of the pipe, and not partly raised, as required by claim 1. Such pipes are shown in all the drawings of Jeltsch *et al.*, and described throughout the description. Figure 1D has been poorly drawn, so that it may appear to show lesser corrugations along the axis of jacket lines "L". The text of Jeltsch *et al.* describes line L-L in Figure 1D as follows:

*Line L-L in FIGS. 1a-1d represents a jacket line of corrugation-free sectors which presents an entirely smooth surface along the surface of the axial length represented by line L-L. [Jeltsch *et al.*, column 4, lines 26-30]*

One of skill in the art, on reading Jeltsch *et al.* would interpret Figure 1D as showing a tube in which lines L-L are flush with the jacket line of the tube. To interpret it any other way goes against the entire disclosure and focus of Jeltsch *et al.* Thus Jeltsch *et al.* does not disclose a tube in which the restrained elongation sections have convolutes, in which the height of the bending sections is greater than the height of the restrained elongation sections. Claim 1 is novel over Jeltsch *et al.*

Dependent claims 2, 6 and 15 are directed to preferred embodiments of the novel tube of claim 1, and hence are also novel over Jeltsch *et al.*

Claims 8, 9, 10, 12 and 13 are directed to various items that incorporate the novel tube of claim 1, and therefore are also novel over Jeltsch *et al.*

US patent no. 5,792,532 (Pfleger)

The Examiner has rejected claims 1-10 and 12-15 under 35 USC §102(b) as being anticipated by Pfleger. The applicant respectfully disagrees.

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Claim 1, as amended, is directed to a flexible tube having a bellows comprising convolutes, wherein the convolutes have opposed bending sections and opposed restrained elongation sections, and wherein the height of the bending sections is greater than the height of the restrained elongation sections, and wherein at least two convolutes are juxtaposed and have their respective bending sections and restrained elongation sections aligned.

Pfleger describes flexible corrugated tubing. The Examiner has pointed out that Figure 3A of Pfleger shows an arrangement wherein some of the convolutes are shorter in height than the others. In the light of this, claim 1 has now been amended by incorporating the subject matter of former claim 14, to recite that the plurality of convolutes includes two convolutes juxtaposed next to each other that each comprise two opposing bending sections and two opposing restrained elongation sections positioned between the bending sections, said two opposing bending sections and said two opposing restrained elongation sections of said two juxtaposed convolutes being aligned with corresponding bending sections and restrained sections of the juxtaposed convolute. Pfleger does not disclose such an arrangement. For example, in Figure 3A, the flattened sections of juxtaposed convolutes are not aligned, but rather rotated with respect to each other. Claim 1 is therefore novel over Pfleger.

Dependent claims 2-6 and 15 are directed to preferred embodiments of the novel tube of claim 1, and hence are also novel over Pfleger.

Claims 8, 9, 10, 12 and 13 are directed to various items that incorporate the novel tube of claim 1, and therefore are also novel over Pfleger.

US patent no. 3,578,777 (DeGain)

The Examiner has rejected claims 1-4, 7-10 and 12-15 under 35 USC §102(b) as being anticipated by DeGain. The applicant respectfully disagrees.

Claim 1, as amended, is directed to a flexible tube having a bellows comprising convolutes, wherein the convolutes have opposed bending sections and opposed

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restrained elongation sections, and wherein the height of the bending sections is greater than the height of the restrained elongation sections, and wherein at least two convolutes are juxtaposed and have their respective bending sections and restrained elongation sections aligned. The claim further recites that each convolute has two opposing bending sections and two opposing restrained elongation sections.

The Examiner has pointed to Figure 6 of DeGain, asserting that it discloses convolutes having opposed bending sections, and opposed restrained sections 29. Figure 6 of DeGain shows a corrugated tube in which the convolutes have four equally spaced depressions 29 around their circumferences. The Examiner asserts that depressions 29 are restrained sections. The presence of four depressions, if they are considered as restrained sections, would result in four opposing restrained sections and four opposing bending sections. In contrast, claim 1, as amended, recites the presence of two restrained elongation sections and two bending sections in each convolute. Claim 1 is novel over DeGain.

Dependent claims 2-4 and 15 are directed to preferred embodiments of the novel tube of claim 1, and hence are also novel over DeGain.

Claims 8, 9, 10, 12 and 13 are directed to various items that incorporate the novel tube of claim 1, and therefore are also novel over DeGain.

Non-obviousness of the amended claims

The invention

The invention provides a flexible tube that is bendable in a bending plane (i.e. the plane passing through the opposing bending sections) and substantially less bendable in a perpendicular plane (i.e. the plane passing through opposing restrained elongation sections). The restrained elongation sections prevent excessive axial expansion of the tube, avoiding axial deformation that can lead to wearing of the tube, detachment from other tubes or parts to which it is attached, or can cause the walls of the tube to come into contact with neighbouring elements, possibly leading to damage.

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US patent no. 6,021,816 (Jeltsch et al.)

As pointed out above, Jeltsch et al. does not disclose the feature that the restrained elongation sections are convolutes that are less raised from the walls of the tube than the bending sections. Instead, Jeltsch et al. show an arrangement wherein the restrained elongation sections are flush with the walls of the tube (i.e. they are convolution free). With this arrangement, the tube described by Jeltsch et al. is said to be bendable, while maintaining tensile stiffness, by virtue of the convolute-free sections.

However, the arrangement described by Jeltsch et al. suffers the disadvantage of being completely rigid to bending in the plane passing through the convolute-free sections. In contrast, the tube of the invention has convolutes of reduced height in the opposing restrained sections. This leads to axial stability (resisting axial deformation), while maintaining some degree of bending ability in the plane of the restrained elongation sections. The small degree of bending in this plane permits the use of the tubing of the invention in uses in which bending in two planes is required. It also facilitates fitting of the tubing to other parts, since the ends of the tubing can be more easily manipulated.

In addition, the arrangement disclosed by Jeltsch et al., in which the side walls of the tube are convolution-free, on blow moulding yields a tube with substantial differences of wall thickness. The convolution-free sections tend to have thicker walls than the convoluted sections. The result is an increase in bending forces as well as higher material stresses locally. The consequences are reduced part flexibility, and higher material fatigue on the convolute free sections, which ultimately impacts design performance and application life time. In contrast, the tube of the invention has reduced height convolutes in the restrained sections, and hence balances local wall thickness. In blow-moulding, this results in a more even wall thickness around the circumference, reducing the risk of blow outs and material fatigue, while improving part flexibility and application life time.

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Jeltsch *et al.* do not teach or suggest to make opposing restrained elongation sections having convolutes of reduced height relative to the opposing bending sections, in order to result in a tube having rigidity in the axial direction while maintaining some bending ability in two planes, and also having more even wall thickness around the circumference of the tube. The invention is not obvious in the light of Jeltsch *et al.*

US patent no. 5,792,532 (Pfleger)

Pfleger does not disclose the feature that the opposing bending sections and opposing restrained elongation sections should be aligned. Instead, Pfleger shows an arrangement wherein the restrained sections on each convolute are offset from each other at an angle. This may result in axial rigidity, but it would not result in a tube which has excellent flexibility in one plane, less flexibility in a perpendicular plane, and resistance to axial deformation. The invention is not obvious in the light of Pfleger.

US patent no. 3,578,777 (DeGain)

DeGain does not disclose a pipe in having two opposing bending sections and two opposing restrained elongation sections. Furthermore, the pipes disclosed in DeGain are not designed for flexibility, but rather for axial compressibility with a degree of resistance that leads to a controlled collapse when the axial compression reaches or surpasses a certain value [DeGain, column 1, lines 30-50]. One of skill in the art would not look to DeGain if he were desirous of designing a tubing having flexibility. The invention is not obvious in the light of DeGain.

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In view of the foregoing, allowance of the above-referenced application is respectfully
requested.

Respectfully submitted,



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